

CLAIMS

1. A device for continuous thermal treatment of granular bulk material (granulate), comprising:
  - a product inlet terminating in a chamber being the first chamber disposed upstream;
  - a product outlet following a last chamber being disposed downstream; and
  - several adjacent fluidization chambers with a separate sieve bottom each through which, via a gas inlet, a fluidization gas can be injected into a respective chamber to fluidize the granulate, such gas can exit via a gas outlet disposed in a roof area of the device, and the first chamber occupies a large part of a total volume of all chambers, and wherein adjacent chambers have a fluid connection by means of product passages in separating walls that are disposed between them.
2. The device in accordance with Claim 1, wherein the product passages are provided between adjacent chambers on a bottom side between the sieve bottom and a lower end area of the separating walls between the adjacent chambers.
3. The device in accordance with Claim 1, wherein the product passages are provided between adjacent chambers on a wall side between a side wall and a lateral end area of the separating walls between the adjacent chambers.
4. The device in accordance with Claim 1, wherein the product passages are provided in the separating walls roughly at a height of an upper end of a fluidized layer.
5. The device in accordance with Claim 1; wherein the product passages extend over an entire width and/or an entire height of the device from one side wall to another side wall and/or from the sieve bottom to an upper end of a fluidized layer.
6. The device in accordance with Claim 2, wherein the product passages are provided as slits.

7. The device in accordance with Claim 6, wherein each slit extends over an entire width and/or the entire height of a separating wall.
8. The device in accordance with Claim 1, wherein along the separating walls that are provided successively in a direction of transportation of a product, the product passages are disposed alternately on the sieve bottom and at a height of an upper end of a fluidized layer.
9. The device in accordance with Claim 1, wherein along the separating walls that are provided successively in a direction of transportation of a product, the product passages are disposed alternately on a left wall-side end and on a right wall-side end of the separating wall.
10. The device in accordance with Claim 1, wherein the position of the product passages is adjustable.
11. The device in accordance with Claim 1, wherein the cross-section of the product passages can be adjusted.
12. The device in accordance with Claim 8, wherein a width of a slit of a cross-section of the product passages is between a minimum dimension of the granulate and approx. 20 cm.
13. The device in accordance with Claim 12, wherein the width of a slit of a cross-section of the product passages is in a range between twice a value of a minimum granulate size and approximately ten times the value of the minimum granulate size.
14. The device in accordance with Claim 1, wherein each product passage that is disposed on the bottom side or roughly at a height of an upper end of a fluidized layer in the separating wall and/or each product passage that is disposed on a wall side is provided with a metal sheet which runs roughly parallel to the sieve bottom and/or respective side wall and which runs roughly perpendicular to the separating wall, wherein such metal sheet is secured on an edge of a respective product passage and

extends, through the product passage, on both sides of such separating wall into the two adjacent chambers.

15. The device in accordance with Claim 14, wherein in an area of bottom-side product passages, essentially opposite of the metal sheet, injection areas are disposed in the sieve bottom which make it possible to inject fluidization gas into the chamber at a speed which permits both a speed component perpendicular to the injection area as well as a speed component parallel to the injection area in a direction of flow of fluidized granulate.
16. The device in accordance with Claim 1, wherein at least the first chamber is connected via its sieve bottom with an associated supply channel for fluidization gas, which is separate from a common supply channel for remaining chambers.
17. The device in accordance with Claim 1, wherein all chambers are associated, via their respective sieve bottom, with a common supply channel for fluidization gas.
18. The device in accordance with Claim 1, wherein at the product outlet, an impact deagglomerator is provided in which the product passage terminates.
19. The device in accordance with Claim 1, wherein the sieve bottoms of all chambers are disposed in a single plane.
20. The device in accordance with Claim 1, wherein the sieve bottoms of the chambers disposed in series along a fluidized granulate stream are arranged at staggered heights.
21. The device in accordance with Claim 1, wherein a layout of the first chamber is defined by a cylindrical surrounding wall, and remaining chambers are concentrically disposed with their cylindrical walls radially on an outside of the first chamber.

22. The device in accordance with Claim 1, wherein a layout of the first chamber is defined by a pair of concentric cylindrical walls, and remaining chambers are concentrically disposed with their cylindrical walls inside an internal cylindrical wall of the first chamber radially towards the inside.
23. The device in accordance with Claim 1, wherein the first chamber has a rectangular layout, and remaining chambers are disposed towards an outside of the first chamber.
24. The device in accordance with Claim 1, wherein a layout of the first chamber is rectangular, and remaining chambers are concentrically disposed inside the first chamber towards an inside, nested inside each other, and also have rectangular layouts.
25. The device in accordance with Claim 1, wherein remaining chambers are designed in such a manner that, in such chambers, a ratio between a layer height of fluidized granulate and a smallest layout chamber size is in a range of 0.5 to 2.
26. The device in accordance with Claim 1, wherein the first chamber that is located farthest upstream occupies a major part of a total volume of all chambers.
27. The device in accordance with Claim 26, wherein the volume of the first chamber accounts for roughly half of the total volume of all chambers.
28. The device in accordance with Claim 1, wherein a sieve bottom surface of the first chamber accounts for a major part of a total sieve bottom surface of all chambers.
29. The device in accordance with Claim 28, wherein sieve bottom surface of the first chamber accounts for roughly half of the total sieve bottom surface of all chambers.

30. The device in accordance with Claim 1, wherein in a roof area of the device between a surface of the fluidized layer and a fluidization gas vent, a zigzag separator is disposed.
31. The device in accordance with Claim 1, wherein on a downstream end of a last chamber, the product outlet is provided in a wall formed as a window and provided with a slider by which a lower edge of the window can be adjusted.
32. The device in accordance with Claim 1, wherein on a downstream end of the last chamber, the product outlet can be provided formed as a type of pivotable gate whose height can be adjusted by pivoting the gate.
33. A method for continuous thermal treatment of granular bulk material (granulate), using the device in accordance with Claim 1, wherein the method comprises:
  - conducting the granulate through the fluidization chambers arranged in series, wherein each such fluidization chamber has a sieve bottom through which, into the respective chamber, a fluidization gas is injected for fluidizing the granulate and, in a roof area of the device, such gas is drawn off, and an absolute filling height of fluidized granulate in the first chamber is at least as high as an absolute filling height of remaining chambers that are disposed downstream therefrom.
34. The method in accordance with Claim 33, wherein into all chambers, the fluidization gas is injected at a uniform first treatment temperature.
35. The method in accordance with Claim 34, wherein the fluidization gas is used as a thermal source for heating the fluidized granulate.
36. The method in accordance with Claim 33, wherein the fluidization gas contains, at least partially, a gas which reacts with the fluidized granulate.

37. The method in accordance with Claim 33, wherein into at least one remaining chamber, a fluidization gas is supplied at a second treatment temperature.
38. The method in accordance with Claim 37, wherein the fluidization gas is used as a cold source to cool the fluidized granulate.
39. The method in accordance with Claim 33, wherein in all chambers, the fluidization gas is supplied with an overpressure and at a same gas speed.
40. The method in accordance with Claim 33, wherein into the first chamber, the fluidization gas is injected at a higher pressure and/or a higher gas speed than into remaining chambers.
41. The device in accordance with Claim 1, wherein the bulk material is polyethylene terephthalate (PET).
42. The device in accordance with Claim 1, wherein the thermal treatment of granular bulk material is the crystallization of polymer granulate.